

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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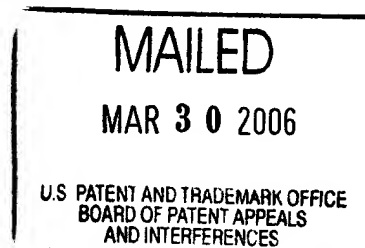
*Ex parte* MARCO NAHMIAS NANNI and  
ANTONIO SERRA

Appeal No. 2006-0574  
Application 09/878,405

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ON BRIEF

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Before GARRIS, WALTZ, and JEFFREY T. SMITH, *Administrative Patent Judges.*

WALTZ, *Administrative Patent Judge.*

**DECISION ON APPEAL**

This is a decision on an appeal from the primary examiner's final rejection of claims 55 through 60 and 62 through 107, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 134.

According to appellants, the invention is directed to processes for producing tires for vehicle wheels (e.g., claim 55), processes for preparing an elastomeric composition (e.g., claims 62, 93, and 102), crosslinked manufactured products (e.g., claim 103), and tires for vehicle wheels (e.g., claim 107), where

the process for producing tires includes a crosslinking step carried out essentially without the need for additional crosslinking agents (Brief, page 8). Further details of the invention may be discerned from illustrative independent claims 55 and 62, reproduced below:

55. A process for producing tyres for vehicle wheels, the process comprising the steps of:

making a raw tyre comprising at least one crosslinkable elastometric material; molding the raw tyre in a molding cavity defined in a vulcanization mold; and crosslinking the elastometric material by heating the tyre to a predetermined temperature for a predetermined time;

wherein the raw tyre comprises at least one crosslinkable elastometric material comprising an elastometric polymer containing epoxide groups and an active filler containing hydroxyl groups dispersed in the elastometric polymer, said at least one crosslinkable elastometric material has an effective degree of crosslinking equal to at least 65% after no more than 5 minutes of heating at 170°C, and wherein the crosslinking step is carried out essentially without additional crosslinking agents.

62. A composition comprising an elastometric polymer containing epoxide groups and an active filler containing hydroxyl groups dispersed in the elastometric polymer, the composition being crosslinkable essentially without additional crosslinking agents and having an effective degree of crosslinking equal to at least 65% after no more than 5 minutes of heating at 170°C.

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The examiner has relied upon the following references as evidence of obviousness:

Muraki et al. (JP '123)            7-90123            Apr. 04, 1995  
(published Japanese Patent Application)<sup>1</sup>

Varughese et al. (Varughese), "Chemical Interaction Between Epoxidized Natural Rubber and Silica: Studies on Cure Characteristics and Low-Temperature Dynamic Mechanical Properties," *J. Applied Polymer Science*, Vol. 44, 1847-1852 (1992).

The claims on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Varughese or JP '123 (Answer, page 3).

Based on the totality of the record, we *affirm* the examiner's rejection over Varughese essentially for the reasons stated in the Answer as well as those reasons set forth below. We reverse the examiner's rejection over JP '123 essentially for the reasons stated in the Brief and Reply Brief, as well as those reasons set forth below. Accordingly, the decision of the examiner is *affirmed*.

#### **OPINION**

##### *A. The Rejection over Varughese*

The examiner finds that Varughese discloses the chemical interaction between epoxidized natural rubber (ENR) and silica, which materials fall within the scope of the claimed

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<sup>1</sup>We rely upon and cite from a full English translation of this document, previously made of record.

"crosslinkable elastomeric material" containing epoxide groups and the active filler containing hydroxyl groups, respectively (Answer, paragraph bridging pages 3-4). The examiner further finds that Varughese teaches crosslinking of the rubber composition in the absence of additional crosslinking agents (Answer, page 4).

The examiner recognizes that the claimed limitation regarding the "effective degree of crosslinking" is not explicitly taught by Varughese but finds that there is a reasonable belief that this prior art reference would have possessed this property (Answer, page 4). The examiner supports this "reason to believe" by finding that the same materials are used in Varughese as in appellants' claimed subject matter, and are processed under the same conditions (*id.*). The examiner notes that these findings are "particularly relevant" to claim 62, which is directed to the composition of elastomeric polymer containing epoxide groups and the active filler containing hydroxyl groups per se (*id.*).

The examiner further finds that the only difference between the claimed subject matter and Varughese is the claimed process for producing tires and particular process steps directed to molding the rubber composition into tire articles (Answer, page

4). However, the examiner concludes that these process steps would have been obvious to one of ordinary skill in the art in view of the teaching in Varughese that the compositions have utility in "oil-resistant, air-impermeable and highly damping" applications, with the examiner noting as well that these steps were "conventional" in the tire art (Answer, paragraph bridging pages 4-5).

Appellants argue that both references fail to teach or suggest each and every element recited in the claims, namely there is no express teaching of the effective degree of crosslinking limitation (Brief, pages 15-16; Reply Brief, page 3). As noted above, appellant is correct that the examiner has admitted that Varughese does not expressly disclose the effective degree of crosslinking limitation. However, mere recitation of a property or characteristic not disclosed by the prior art does not necessarily confer patentability to a composition or a method of using that composition. See *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 82 (CCPA 1975). Where the examiner establishes a reasonable belief that the property or characteristic recited in the claims would have been inherent to the product or process, the burden of proof shifts to appellants to show that this characteristic or property is not possessed by the prior art.

See *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657-58 (Fed. Cir. 1990). We determine that the examiner has established a "reasonable belief" by finding that the elastomeric polymer containing epoxide groups and the active filler containing hydroxyl groups recited in the claims on appeal encompass the specific materials taught by Varughese, and the reaction conditions such as heating temperature, duration of heating, thorough mixing and absence of crosslinking agents, are also encompassed by this reference (e.g., see Varughese, page 1847, right column, and Table II, page 1848, Mix D).

Appellants argue that Varughese teaches that its process produces products that have an unacceptably low degree of crosslinking, and thus one of ordinary skill in this art would expect little or no crosslinking (Brief, pages 16, 18 and 22; Reply Brief, page 6). This argument is not well taken. As correctly noted by the examiner (Answer, page 6), Varughese does not teach an "unacceptably low degree of crosslinking" but gives evidence "for the higher reinforcing ability of silica in ENR" resulting from a "comparatively good number of cross-links" even in the absence of any conventional crosslinking agents (page 1849, paragraph bridging left and right columns).

Appellants argue that the mere combination of an elastomeric material containing epoxide groups and an active filler containing hydroxyl groups does not inherently yield a composition with the required degree of crosslinking, but the effective degree of crosslinking is a function of the amount of recited material, time, temperature, and other materials (Brief, page 18; Reply Brief, page 3).

This argument is also not persuasive. As discussed above, the examiner has established that Varughese teaches combining the same reactants in the same amounts and under the same conditions as appellants' process. Furthermore, appellants have not addressed claim 62, which is directed to the composition per se of "elastomeric polymer containing epoxide groups" and an "active filler containing hydroxyl groups" which is *capable of being crosslinked* ("being crosslinkable") without crosslinking agents to produce an effective degree of crosslinking equal to at least 65% after no more than 5 minutes of heating at 170°C. See claim 62 on appeal. Even though Varughese does not explicitly disclose the effective degree of crosslinking, it is clear that this reference discloses compositions of ENR and silica within the scope of the claimed "elastomeric polymer containing epoxide groups" and the "active filler containing hydroxyl groups"

(Varughese, Table II, page 1848). Appellants exemplify compositions of ENR 50 (50 mol % epoxidized natural rubber) (Table 2, page 26 of the specification) and VN3 silica (page 15, l. 26), while Varughese also exemplifies ENR-50 and Ultrasil VN3 (page 1848, Tables 1 and 2).

With regard to the rejection of claims 93, 102 and 103, appellants argue that there is no teaching in Varughese regarding the claimed "degree of dispersion" (Brief, pages 24-25; Reply Brief, pages 11-12). This argument is not persuasive for reasons stated above. Although this characteristic or property is not explicitly disclosed by Varughese, there is reasonable belief that this property is inherently possessed by the mixture of the reference. See *In re Best, supra*; *In re Spada, supra*. Varughese teaches mixing of the ENR-50 and silica in a two-roll mixing mill, with care taken to ensure that the mill-roll temperature does not exceed the set temperature to avoid any crosslinking during mixing (paragraph bridging pages 1847-48). Appellants teach that mixing of the ENR and silica can occur "according to techniques known in the art," including an open-mill mixer (specification, page 18, ll. 21-29). Appellants further teach that during the mixing the temperature is kept "below a predetermined value so as to avoid premature cross-linking of the



composition" (specification, page 19, ll. 1-3). Accordingly, since the mixing is done by the same or conventional methods under the same conditions, we determine that there is a reasonable belief that the degree of dispersion for the Varughese composition would be the same or similar as the claimed range (see the specification, page 16, ll. 20-27, for the definition of the dispersion index). See *In re Best*, *supra*; *In re Spada*, *supra*.

For the foregoing reasons and those stated in the Answer, we determine that the examiner has established a prima facie case of obviousness in view of Varughese. Appellants, in rebuttal, argue that the only test data of record supports the fact that the claim limitation regarding the effective degree of crosslinking is not inherent (Brief, page 19; Reply Brief, page 4). Accordingly, we begin anew and consider the evidence for and against obviousness. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

Appellants argue that, according to Figure 1 of Varughese, the torque increase for Mix D after 1 hour of heating at 180°C. is about 5 dN•m while appellants' Example 5 shows a near 15 dN•m increase after only 30 minutes at 170°C (Brief, page 19).

These results are not persuasive of non-obviousness for the following reasons. To be truly comparative, all variables must be kept constant except the one being relied upon to show unexpected results. See *In re Dunn*, 349 F.2d 433, 439, 146 USPQ 479, 483 (CCPA 1965). Here Example 5 uses more silica filler than Mix D in Varughese, as well as using Vulkanox® HS, an antioxidant (see the specification, page 26). Furthermore, any comparative showing must be commensurate in scope with the claimed subject matter. See *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). Here Example 5 is specific to a particular ENR and silica in certain amounts, as well as containing an antioxidant, while the claims on appeal are not so limited. Finally, we note that, assuming *arguendo* that the results are comparable, these examples merely show that Example 5 in the specification produces more crosslinking than Mix D in Varughese, but does not establish that the effective degree of crosslinking in Varughese falls significantly below 65% under the claimed time and temperature conditions.

Appellants argue that they have been able to calculate the effective degree of crosslinking after no more than 5 minutes of heating at 180°C. for each mixture reported by Varughese, and the effective degree of crosslinking shown by these reference

mixtures does not fall within the scope of the claims (Brief, pages 19-20; Reply Brief, pages 7-9). Appellants further argue that Comparative Examples 13 and 14 in Table 4 of the specification show that the claimed limitation is not inherent in Varughese (Brief, page 20; Reply Brief, page 6).

This evidence is not persuasive of non-obviousness. As correctly noted by the examiner (Answer, page 7), Comparative Examples 13 and 14 (Table 4 on page 29 of the specification) merely show the effect of replacing large amounts of the silica (the active filler containing hydroxyl groups) with large amounts of a filler without hydroxyl groups (carbon black; see the specification, page 24, ll. 12-14). Thus less crosslinking (or reaction between the epoxy groups of the ENR and the hydroxyl groups of the filler) would have been expected by one of ordinary skill in this art. This is taught by appellants at lines 4-5 of page 29 of the specification, where appellants state that the mixture of ENR 50, silica and carbon black is capable of crosslinking effectively "provided that the silica is predominant relative to the total amount of filler added." We determine that these comparative examples do not support appellants' argument that "the mere combination of the claimed elements does not

inherently yield a composition with the required degree of cross-linking" (Brief, page 20).

Based upon the data provided by Varughese in Figure 1, appellants have estimated the degree of crosslinking for each mixture reported by the reference that does not contain additional crosslinking agents, and these estimates are well below the claim limitation of at least 65% after 5 minutes of heating at 170°C. (Brief, pages 19-20; Reply Brief, pages 7-10). The examiner states that these "estimations are of no probative value" since there is no rationale as to how these values have been calculated (Answer, page 6). There are no calculations or rationale in the Brief (pages 19-20) but these are supplied for the first time in the Reply Brief (pages 7-10). Although we agree with appellants' estimations of the minimum and final torque values from Figure 1 of Varughese, we fail to find any calculations supporting the estimation of the effective torque, which may be "unambiguously determined" from the MDR curve by the method disclosed on page 9, ll. 1-13, of the specification. Appellants have "estimated" the effective torque by an entirely different procedure and have not explained any rationale or acceptance in the art for this new procedure (Reply Brief, page 9). As the value of the effective torque markedly affects the

calculations in Equation 1 (specification, page 8), appellants' estimated values for the effective degree of crosslinking in the compositions of Varughese cannot be accepted as probative evidence of non-obviousness.

Based on the totality of the record, including due consideration of appellants' arguments and evidence, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of section 103(a). Therefore we affirm the examiner's rejection of the claims on appeal under section 103(a) over Varughese.

*B. The Rejection over JP '123*

The examiner finds that JP '123 discloses rubber compositions which incorporate the claimed epoxidized natural rubber in conjunction with hydroxyl containing silica filler (Answer, page 5). Although the examiner admits that the effective degree of crosslinking limitation is not explicitly disclosed by JP '123, the examiner relies on the rationale discussed above regarding the reasonable belief that this limitation is possessed by JP '123 (*id.*). The examiner recognizes that the difference between the claimed subject matter and this reference is that the reference incorporates additional crosslinking agents (*id.*). However, the examiner construes the

claimed limitation "essentially without additional crosslinking agents" as including the low amounts of crosslinking agent added by JP '123 (*id.*).

As correctly argued by appellants (Brief, page 24; Reply Brief, pages 13-14), the contested claim limitation is clearly defined in the specification at page 7, l. 27-page 8, l. 7. See *Phillips v. AWH*, 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005) (*en banc*) (the specification is usually the single best guide to the meaning of a contested term). This definition clearly excludes the amounts of crosslinking agents found in the examples of JP '123 (see Table 1, page 7). However, we also note that the use of crosslinking agents, such as sulfur, are taught as optional ingredients in the rubber and silica compositions of JP '123 ("if necessary," page 5, ¶[0021]).

We determine that the examiner has not established a reasonable belief that the compositions of JP '123 would have an effective degree of crosslinking within the scope of the claims, without the use of additional crosslinking agents, since JP '123 teaches that "ENR does not react with the silica" and the silica does not disperse well (page 3, ¶[0013]). Accordingly, we determine that one of ordinary skill in this art would have had no expectation of successfully crosslinking an ENR and silica

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composition of JP '123 without the use of additional crosslinking agents, nor achieving the claimed dispersion index values. Therefore we determine that the examiner has not established a prima facie case of obviousness in view of this reference evidence. Accordingly, the rejection of the claims on appeal under section 103(a) over JP '123 is reversed.

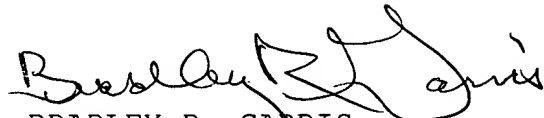
*C. Summary*

The rejection of claims 55-60 and 62-107 under 35 U.S.C. § 103(a) over Varughese is affirmed. The rejection of claims 55-60 and 62-107 under 35 U.S.C. § 103(a) over JP '123 is reversed. The decision of the examiner is thereby affirmed.

Appeal No. 2006-0718  
Application No. 09/630,944

No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a)(1)(iv)(2004).

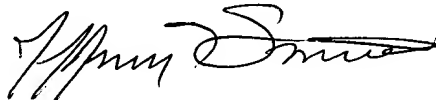
**AFFIRMED**



BRADLEY R. GARRIS )  
Administrative Patent Judge )



THOMAS A. WALTZ )  
Administrative Patent Judge )



JEFFREY T. SMITH )  
Administrative Patent Judge )

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FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER LLP  
901 NEW YORK AVENUE, N.W.  
WASHINGTON, DC 20001-4413